RADIO IN FOREST PROTECTION

Radio Talk by George A. Duthie, Chief of the Division of Information, U. S. Forest Service, Friday, August 3, in the National Farm and Home Hour.

This is the season of the year when fire is in the mind of every forest officer. In especially dry seasons, such as the present one, he works, eats, and sometimes even sleeps with the subject of fire uppermost in his mind. The United States Forest Service is endeavoring to bring into play every possible aid of science and organization to keep fire in check in the forests. A few weeks ago, Assistant Forester Roy Headley told you some of the ways in which the Forest Service is trying to meet the fire menace with specialized equipment. One of the special developments has been the radio. As an aid in the protection of the National Forests from fire, it is proving of such outstanding value that I believe a brief account of the development of special portable Forest Service sending and receiving sets will be of interest to the Farm and Home Hour audience.

For many years, in fact ever since radio telephones were first developed, the prayer of the Forest Ranger, struggling madly through a wilderness country to report fires has been, "Oh if I only had a radio". Since 1920 the Forest Service has been at work on the problem of adapting radio communication to forest fire control, and its work reached the point in 1930 of actual trial under field conditions in the Columbia National Forest - one of the big, rugged forests of the Pacific Northwest.

You know minutes count when a Forest fire is spreading. How often have small fires become raging conflagrations while the Forest patrol man - the "smoke chaser"--was going for help. A radio that he could carry with him in his knapsack would save those precious minutes. And so it is proving. The feather-weight set developed by the Forest Service radio men weighs but 13 pounds including batteries, antenna, containers, and everything. This set receives voice, but its batteries are not strong enough to send the voice. It does however readily send out the Morse code signals, and in a very few minutes the smoke chaser upon reaching a fire can hang up his antenna between a couple of trees and sent out his cry for help to the lookout and dispatching stations where forest officers are constantly on the alert with more powerful sets to receive his signals.

We used to establish communication with fire camps on large fires by stringing, sometimes, miles of emergency telephone wire. Now we send the radio equipment to the fire camps with the fire trucks or pack trains - these sets weigh about 50 pounds and are capable of receiving and transmitting voice so that direct conversation may now be carried on, not only between the fire camp and the outside world, but also between the fire fighting crews on the various sections of the fire lines.

The history of the development of this equipment has been interesting although at times discouraging for there were many difficulties to be overcome.

The chief obstacles were:

1. The absorption of radio energy by the green timber.

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2. The shadow effects of rough topography. Under high mountains there might be "dead spots" from which low-power radio signals could not emerge.

3. The deadening effect of static and fading in the mountainous country, an effect that varies for different wavelengths and for different periods of the day.

4. The difficulty of erecting long antennas in the forest where the thicket of undergrowth and swaying branches of trees would interfere.

5. The mechanical difficulty of constructing a set with a combination of extremely light weight and the sturdy construction which is necessary to withstand the hazards of transportation in a wilderness country.

6. Simplicity of design which will obviate delicate adjustments and tuning so that the apparatus can be operated by inexperienced and unskilled men.

It would be a simple matter to build radio sets that would overcome any one of these obstacles, but to successfully meet all of them in combination presented a discouraging, yes even hopless, problem for many years.

A survey of existing equipment failed to disclose any that would meet these exacting requirements. Some radio engineers thought it was impracticable. So it became necessary for the Forest Service to develop its own. As the result of fourteen years of intensive research and exoerimentation it now has developed three types of instruments.

The "feather-weight" set, weighing, complete, about 13 pounds is light enough for quick transportation and rugged enough to be jogged over a mountain pass on the back of man or mule without being damaged. This set receives voice but transmitts code only unless provided with a heavier battery which adds 10 more pounds to the weight. The dependable radius of communication is about 10 miles.

The "welter-weight" set, weighing about 50 pounds was developed for camp use where transportation weight was not a factor. The outstanding feature of this set is that it receives and transmits by both voice and code. A third set is a more powerful radio which uses a 110 volt alternating current. This is the stand-by set at the central headquarters. It mothers its flock of portable sets out in the brush that are sending in their discovery and progress reports.

We are also experimenting with an ultra short wave set having a wavelength of only 9 1/2 meters. It is a tiny instrument that can be mounted on an automobile and communication carried on both ways as the car moves through the forest provided the sender is on a point practically within the range of visibility of the receiver. The important feature of this set is that it is immune to static interference, a very important feature in high mountain country.

The Forest Service will of course make further improvements in all the sets as they are suggested by actual use. It began actual field use of the sets in 1930. This year, we have between seven and eight hundred sets in actual use, and radio is being relied on for emergency communication in dozens of National Forests. It has already saves us from probable serious fire disasters in a number of cases. Of course, radio will not be a cure-all. It will not put out the fires. We must still rely on your cooperation, and the cooperation of every person who goes into the forests, to prevent fires from starting, if we are to lastingly check the huge loss and waste that fires cause every year in this country's valuable forests.